UP - PGT CHEMISTRY 2

PGT I GIC I KVS I NVS I BPSC I DSSSB

MOCK TEST

1. An ideal gas undergoes isothermal expansion at constant pressure. During the process

(a) Enthalpy increases but entropy decreases

(b) Enthalpy remains constant but entropy increases

(c) Enthalpy decreases but entropy increases

(d) Both enthalpy and entropy remain constant.

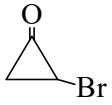
2. A sealed container with gas at 2.00 atm is heated from 20.0 K to 40.0 K. The new pressure is:

(a) 0.50 atm (b) 1.00 atm (c) 4.00 atm (d) 2.14 atm

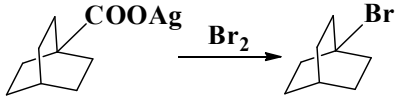
3. An element having an atomic radius of 0.14 nm crystallizes in an fcc unit cell. What is the length of a side of the cell?

(a) 0.96 nm (b) 0.4 nm (c) 0.24 nm (d) 0.56 nm

4. Which carbonyl compound has maximum dipole moment?

(a)  (b)  (c)  (d) 

5. Following reaction goes through :



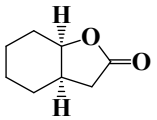
(a) Carbene intermediate (b) Free radical intermediate

(c) Carbocation intermediate (d) Carbanion intermediate

6. Oxidation product of quinoline with $KMnO_4$ is :

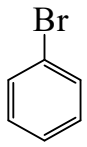
(a) Phthalic anhydride (b) Phthalic acid (c) Nicotinic acid (d) None of these

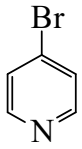
7. In the IR spectrum, carbonyl absorption band for the following compound appears at

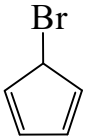


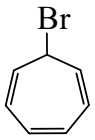
(a) 1810 cm^{-1} (b) 1770 cm^{-1} (c) 1730 cm^{-1} (d) 1690 cm^{-1}

8. The compound that gives precipitate on warming with aqueous $AgNO_3$ is :

(a) 

(b) 

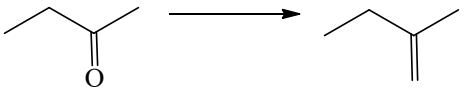
(c) 

(d) 

9. Which of the following alcohols would be most soluble in water?

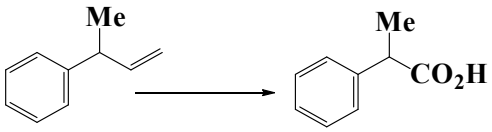
(a) Propanol (b) Hexanol (c) Pentanol (d) Butanol

10. Which of the reagent will give effective transformation of given compounds?



(a) CH_2N_2 (b) CH_3Li (c) $(CH_3)_2CuLi$ (d) $Ph_3P = CH_2$

11. What is used to carry out the following conversion?



(a) Hydroboration oxidation followed by Jones oxidation
(b) Wacker oxidation followed by haloform reaction
(c) Oxymercuration – demercuration followed by Jones oxidation
(d) Ozonolysis followed by haloform reaction

12. What is a necessary condition for osmosis to take place?

(a) Semi–permeable membrane (b) Same concentration of solvent
(c) High temperature (d) Pressure greater than osmotic pressure

13. Which is the most appropriate method for determining the molar masses of biomolecules?

(a) Relative lowering of vapor pressure (b) Elevation of boiling point
(c) Depression in freezing point (d) Osmosis

14. If a reaction is of n^{th} order the half life period of the initial concentration of reactants.

(a) Is independent (b) Varies inversely as $(n-1)^{th}$ power
(c) Varies inversely at n^{th} power (d) Varies directly as $(n-1)^{th}$ power

15. The time taken for 10% completion of a first order reaction is 20 min. Then, for 19% completion, the reaction will take, given [log 81 = 1.908]

(a) 40 min (b) 60 min (c) 30 min (d) 50 min

16. The concept of $t_{1/2}$ is useful for the reaction of:

(a) Zero order (b) 1 order (c) 2 order (d) All order

17. Which of the following represent the correct bond orders for N_2, N_2^+ and N_2^- molecules?

(a) 3.0, 2.5, 2.5 (b) 3.0, 2.0, 2.5 (c) 3.0, 3.0, 3.0 (d) 2.5, 2.5, 2.5

18. Which transitions are studies by UV spectrophotomer?

(a) Rotational (b) Electronic (c) Vibrational (d) Nuclear

19. Which of the following statement is correct?

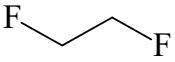
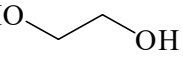
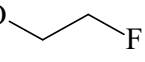
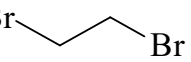
(a) The properties of various actinoids are very similar

(b) 4f and 5f orbitals are equally shielded

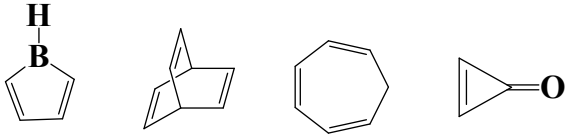
(c) d–block elements show irregular and erratic chemical properties

(d) 4d and 5d orbitals are equally shielded

20. Among the following compounds the compounds having anti–conformation as most stable conformation?

(a)  (b)  (c)  (d) 

21. The compound that is antiaromatic is



I II III IV

(a) I (b) II (c) III (d) IV

22. A covalent molecule AB_3 has pyramidal structure. The number of lone pair and bond pair electrons in the molecule are respectively

(a) 2 and 2 (b) 1 and 3 (c) 0 and 4 (d) 3 and 1

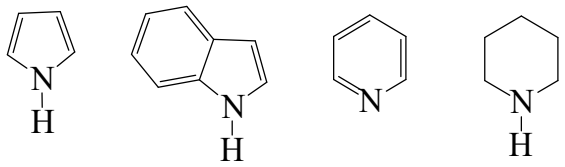
23. Complexes in which a metal is attached to only one kind of donor group is called

(a) Unidentate (b) Chelate (c) Homoleptic (d) Heteroleptic

24. For the given complex $[CoCl_2(en)(NH_3)_2]^+$, the number of geometrical isomers, the number of optical isomers and total number of isomers of all type possible respectively are

(a) 0, 1, 3 (b) 0, 2, 2 (c) 2, 2, 3 (d) 3, 3, 4

25. The correct order of the basicity of the following compounds is



I II III IV

(a) IV > III > II > I (b) III > IV > II > I
(c) IV > III > I > II (d) III > IV > I > II

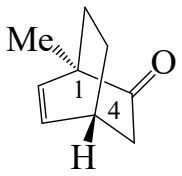
26. The donation of lone pair of electrons of CO carbon into the vacant orbital of metal atom results in _____ bond.

(a) Sigma (b) pi (c) Back (d) Synergic

27. A complex having _____ geometry can have more than one type of hybridization.

(a) Tetrahedral (b) Square planar
(c) Trigonal bipyramidal (d) Octahedral

28. The configuration at the two stereocentres in the compound given below are



(a) 1R, 4R (b) 1R, 4S (c) 1S, 4R (d) 1S, 4S

29. In BrF_3 molecule the lone pairs occupy an equatorial position to minimize

(a) Lone pair–bond pair repulsion only
(b) Bond pair–bond pair repulsion only
(c) Lone pair–lone pair repulsion and lone pair–bond pair repulsion
(d) Lone pair–lone pair repulsion only

30. Identify the wrong statement in the following

(a) Atomic radius of the elements decreases as one move across from left to right in the 2nd period of the periodic table

(b) Atomic radius of the elements increases as one move down the first group of the periodic table

(c) Amongst isoelectronic species, greater the negative charge on the anion, larger is the ionic radius

(d) Amongst isoelectronic species, smaller the positive charge on the cation, smaller is the ionic radius

31. The one which decreases with dilution is

(a) Specific conductance (b) Molar conductance

(c) Conductance (d) Equivalent conductance

32. In which of the following octahedral complexes of Co (atomic no. 27), will the magnitude of Δ_0 be the highest?

(a) $[Co(NH_3)_6]^{3+}$ (b) $[Co(CN)_6]^{3-}$ (c) $[Co(H_2O)_6]^{3+}$ (d) $[Co(C_2O_4)_3]^{3-}$

33. On increasing the concentration of reactants in a reversible reaction, then equilibrium constant will

(a) Depend on the concentration (b) Increase

(c) Unchanged (d) Decrease

34. According to Wade's theory the anion $[B_{12}H_{12}]^{2-}$ adopts

(a) Closo–structure (b) Arachno–structure

(c) Hypo–structure (d) Nido–structure

35. The oxo–acid of phosphorus having P–atoms in +4, +3 and +4 oxidation states respectively, is

(a) $H_5P_3O_{10}$ (b) $H_5P_3O_7$ (c) $H_5P_3O_8$ (d) $H_5P_3O_9$

36. With respect to enthalpy of combustion which of the following is correct?

(a) $\Delta H_{rxn} = \Sigma\Delta H_f(\text{product}) - \Sigma\Delta H_f(\text{reactant})$

(b) $\Delta H_{rxn} = \Sigma\Delta H_f(\text{reactant}) - \Sigma\Delta H_f(\text{product})$

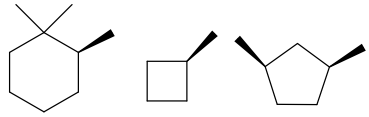
(c) $\Delta H_{rxn} = \Sigma\Delta H_f(\text{product}) + \Sigma\Delta H_f(\text{reactant})$

(d) $\Delta H_{rxn} = 2\Sigma\Delta H_f(\text{product}) - \Sigma\Delta H_f(\text{reactant})$

37. Which of the following molecules exists as a pair of enantiomers?

(a) 2–Bromopropane (b) 1–Bromo–3–methylbutane
(c) 2–Cyclohexen–1–ol (d) cis–1,2–Dichlorocyclobutane

38. Which of the following compound(s) is/are chiral?



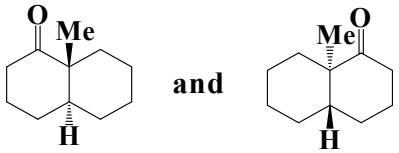
A B C

(a) Only A and B (b) Only B (c) Only B and C (d) Only A

39. How many chiral carbon atoms are present in 2, 3, 4–trichloropentane?

(a) 2 (b) 1 (c) 3 (d) 4

40. The two compounds given below are



(a) Enantiomers (b) Identical (c) Diastereomers (d) Regioisomers

41. The molar volume of any ideal gas at N.T.P. is

(a) 10 litres (b) 44.8 litres (c) 21 litres (d) 22.4litres

42. At what temperature are average speeds of CH_4. Will be same as that of O_2 at 300K

(a) 150K (b) 300K (c) 600K (d) 900K

43. The expected $H-\overset{\oplus}{H}-H$ bond angle in

(a) 180° (b) 120° (c) 60° (d) 90°

44. Which type of colloid is the dissolution of sulphur (S_8)

(a) Micelle (b) Multimolecular colloid
(c) Associated colloid (d) Macromolecular colloid

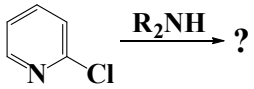
45. Antacids are found in medicines that cure :

(a) Eye sight (b) Stomach ache (c) Pimples (d) Headache

46. Which of the following compounds gives a primary alcohol upon reaction with phenylmagnesium bromide?

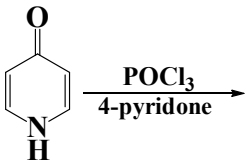
(a) 2–methyloxirane (b) Ethylene oxide

(c) Ethyl format (d) Carbon dioxide

47. What will be the product of the following reaction? 

(a) 3–aminopyridine (b) 2–aminopyridine

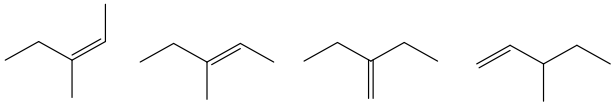
(c) 3,5–diaminopyridine (d) 2,5–diaminopyridine

48. What will be the product of the following reaction? 

(a) 3–chloropyridine (b) 2–dichloropyridine

(c) 3,5–dichloropyridine (d) 2,5–dichloropyridine

49. Which of the following akenes yield(s) 3–bromo–3–methylpentane as the major product upon addition of HBr?



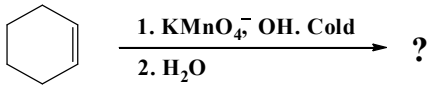
I II III IV

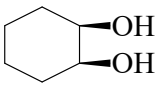
(a) I and II only (b) III only (c) I, II and III only (d) All of them

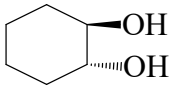
50. What will be the atomic number of the element, if the last entering electron in an element has quantum number n = 3, l = 2, m = + 2 and s = + 1 /2.

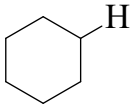
(a) 13 (b) 21 (c) 29 (d) 39

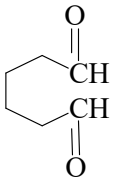
51. What is the major organic product of the following reaction?



(a) 

(b) 

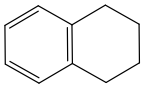
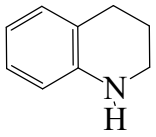
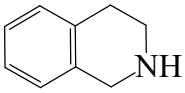
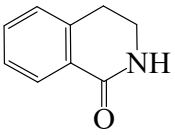
(c) 

(d) 

52. **The least basic among the following is**

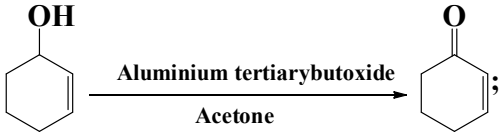
(a) $Al(OH)_3$ (b) $La(OH)_3$ (c) $Ce(OH)_3$ (d) $Lu(OH)_3$

53. **Which one of the following compounds undergoes bromination of its aromatic ring (electrophilic aromatic substitution) at the fastest rate?**

(a)  (b)  (c)  (d) 

54. **The pair of having similar geometry is :**

(a) BF_3 and NH_3 (b) H_2O and C_2H_2 (c) CO_2 and SO_2 (d) NH_3 and PH_3

55.  **; The given reaction is known as :**

(a) Kolbe reaction (b) Tischenko reaction

(c) MPV reaction (d) Oppeneur oxidation

56. **Which of the following statements is not true with respect to chemisorptions?**

(a) Depends on nature of adsorbate and adsorbent

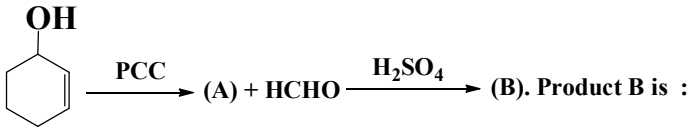
(b) Has a large heat of adsorption

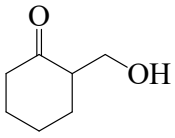
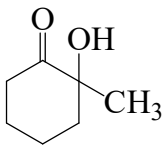
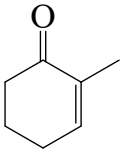
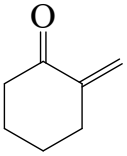
(c) Forms a unimolecular layer

(d) Occurs at low temperature

57. **What are the dispersed phase and dispersion medium in alcohol respectively?**

(a) Alcohol, water (b) Solid, water (c) Water, alcohol (d) Solid, alcohol

58. 

(a)  (b)  (c)  (d) 

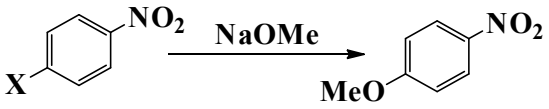
59. Which of the following cannot be formed from Sandmeyer reaction on benzenediazonium chloride?

(a) Chlorobenzene (b) Bromobenzene (c) Iodobenzene (d) Benzonitrile

60. Which of the following can be produced by Gatterman reaction of diazonium salts?

(a) Bromobenzene (b) Fluorobenzene (c) Nitrobenzene (d) Cyanobenzene

61. The correct order of reactivity of p–halo nitrobenzene in the following reaction is



X = F, Cl, Br, I

(a) p–chloronitrobenzene > p–iodonitrobenzen > p–fluorontorbenzene > p–bromonitrobenzen

(b) p– iodonitrobenzen > p–chloronitrobenzene > p–bromonitrobenzen > p–fluorontorbenzene

(c) p–iodonitrobenzen > p–bromonitrobenzen > p–chloronitrobenzene > p–fluorontorbenzene

(d) p–bromonitrobenzen > p–fluorontorbenzene > p–iodonitrobenzen > p–chloronitrobenzene

62. Consider the following : According the Werner's theory

A. Ligands are connected to the metal ions by covalent bonds

B. Secondary valence is have directional properties

C. Secondary valences are non–ionisable of these statements choose the correct answer from the options given below:

Choose the correct option:

(a) A, B and C only (b) B and C only (c) A and C only (d) A and B only

63. According to MO theory, for the diatomic species, C_2

(a) Bond order is zero and it is diamagnetic

(b) Bond order is two and it is paramagnetic

(c) Bond order is two and it is diamagnetic

(d) Bond order is zero and it is paramagnetic

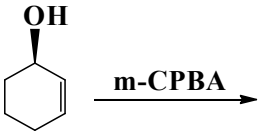
64. The number of microstates present in ^3F term is

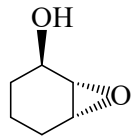
(a) 3 (b) 21 (c) 9 (d) 28

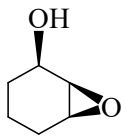
65. How many M — M bonds are present in $[Cp\ Mo(CO)_3]_2$?

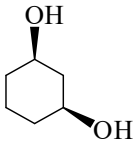
(a) 1 (b) 2 (c) 0 (d) 4

66. When (R)–cyclohex–2–en–1–ol is treated with acid below gives



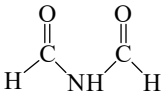
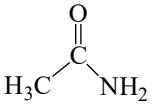
(a) 

(b) 

(c) 

(d) None of these

67. What will be the order of rotation barriers about C–N bond among these compounds?

(I) $CH_3—CH_2–NH_3$ **(II)**  **(III)** 

(a) I > II > III (b) I < II < III (c) II > III > I (d) III > I > II

68. Which one of the following has the smallest heat of hydrogenation?

(a) 1–Butene (b) trans–2–Butene (c) cis–2–Butene (d) 1,3–Butadiene

69. The equivalent conductance of Ba^{2+} and Cl^- are respectively 127 and 76 ohm^{-1} cm^{-1} eq^{-1} at infinite dilution. The equivalent conductance of $BaCl_2$ at infinite dilution will be :

(a) 101.5 (b) 139.5 (c) 203 (d) 279

70. For spontaneous adsorption of gas :

(a) ΔS is positive so ΔH should be negative

(b) ΔS is negative so ΔH should be highly positive

(c) ΔS is negative so ΔH should be highly negative

(d) ΔS is positive so ΔH should also be highly positive

71. What is the catalyst used in manufacture of Ammonia by Haber's process?

(a) Fe (b) Molybdenum (c) Silica (d) Aluminium

72. The concentrations of a species A undergoing the reaction $A \rightarrow P$ is 1.0, 0.5, 0.33, 0.25 mol dm^{-3} at t = 0, 1, 2 and 3 seconds, respectively. The order of the reaction is

(a) 2 (b) 1 (c) 0 (d) 3

73. A nucleotide is formed of which of the following units?

(a) Nitrogen base and phosphate (b) Nitrogen base, sugar and phosphate

(c) Nitrogen base and sugar (d) Sugar and phosphate

74. To which of the following does guanine form hydrogen bonds in DNA?
(a) Adenine (b) Thymine (c) Cytosine (d) Guanine

75. Glycine and proline are the most abundant amino acids in which of the following structure?
(a) Hemoglobin (b) Myoglobin (c) Insulin (d) Collagen

76. Which is not a type of catalyst?
(a) Positive catalyst (b) Negative catalyst
(c) Auto catalyst (d) Homogeneous catalysis

77. Mg_2C_3 reacts with water forming propyne, C_3^{4-} has:
(a) Two sigma and two pi bonds (b) Three sigma and one pi bonds
(c) Two sigma and three pi bonds (d) Two sigma and one pi bonds

78. In the formation of N_2^+ from N_2, the electron is removed from :
(a) σ orbital (b) π orbital (c) σ^* orbital (d) π^* orbital

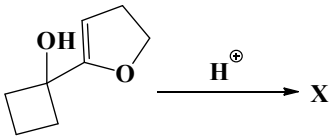
79. XeF_2 is isostructural with
(a) ICl_2^- (b) $SbCl_3$ (c) $BaCl_2$ (d) TeF_2

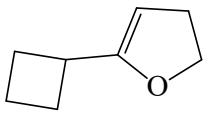
80. What is the reason for iodoform to be used as an antiseptic?
(a) Due to its unpleasant odour (d) Due to its melting point
(c) Due to its solubility in alcohol (d) Due to the liberation of free iodine

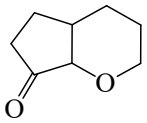
81. Which of the following complex has a highest oxidation state of metal?
(a) $(\eta^6\text{–}C_6H_6)_2Cr$ (b) $Mn(CO)_5Cl$ (c) $Na_2[Fe(CO)_4]$ (d) $K[Mn(CO)_5]$

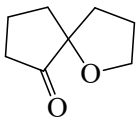
82. Which among the following product is formed when ethyne undergoes hydrogenation?
(a) Formaldehyde (b) Formic acid (c) Acetaldehyde (d) Acetic acid

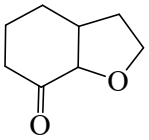
83. What is X in the following conversion?



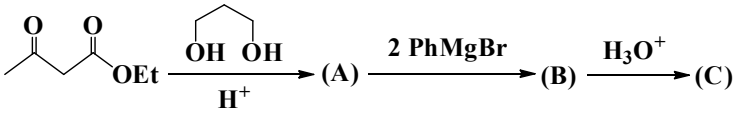
(a) 

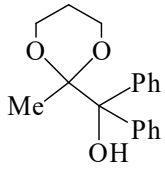
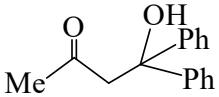
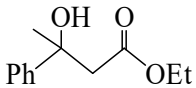
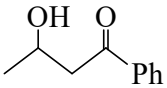
(b) 

(c) 

(d) 

84. Find the final product (C) in the following reaction is



(a)  (b)  (c)  (d) 

85. The number of substitution products formed when metabromo anisole is treated with KNH_2/NH_3 ?

(a) 1 (b) 2 (c) 3 (d) 4

86. The equilibrium constant (K) of a redox reaction is related to the standard potential, E°, by the equation

(a) ln(K) = –(nFE°/ RT) (b) ln(K) = (nFE°/ RT)

(c) ln(K) = (RT/ nFE°) (d) ln(K) = –(RT/ nFE°)

87. At which of the following temperatures the reaction $Br_2(l) + Cl_2(g) \rightarrow 2BrCl(g)$ will be at equilibrium if $\Delta H = 30$ kJ mol^{-1} and $\Delta S = 170$ J K^{-1} mol^{-1} ?

(a) 273 K (b) 285.7 K (c) 300 K (d) 450 K

88. Which of the following is an associated colloid?

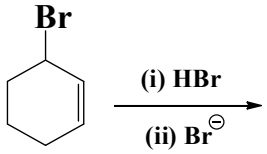
(a) Starch (b) Soap (c) Proteins (d) Sol of gold

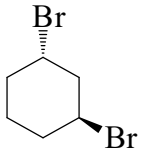
89. What will be the value of Kp if the Kc is 26 for a reaction, $PCl_5 \rightleftharpoons PCl_3 + Cl_2$ at 25 degree Celsius :

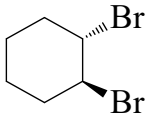
(a) 0.46 (b) 0.57 (c) 0.61 (d) 0.83

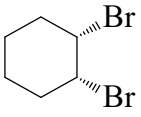
90. When Q (concentration quotient) is smaller than equilibrium constant reaction will :
(a) Be in equilibrium (b) Proceed in forward direction
(c) Proceed in backward direction (d) None of the above

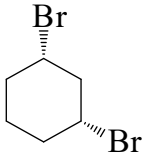
91. Identify major product for the following reaction



(a) 

(b) 

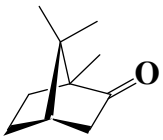
(c) 

(d) 

92. Identify the correct relation between Δ_o and Δ_t where Δ_o denotes crystal field splitting in octahedral complexes and Δ_t denotes crystal field splitting in tetrahedral complexes
(a) $\Delta_o < \Delta_t$ (b) $\Delta_o > \Delta_t$ (c) $\Delta_o = \Delta_t$ (d) $\Delta_o \geq \Delta_t$

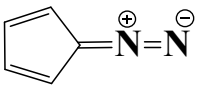
93. The complex $[Co(H_2O)_6]^{3+}$ absorbs the wavelength of light corresponding to orange colour. Predict the colour of the coordination compound based on this information :
(a) Red (b) Yellow (c) Blue (d) Colourless

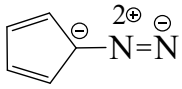
94. The absolute configuration at the two chiral cdntres of (–)–camphore is

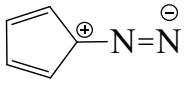


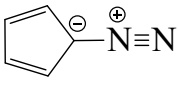
(a) 1R, 4R (b) 1R, 4S (c) 1S, 4R (d) 1S, 4S

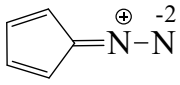
95. The most stable resonating structure of the following compound is



(a) 

(b) 

(c) 

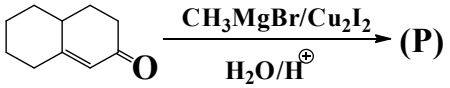
(d) 

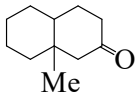
96. All the metals form oxides of the type MO except
(a) Copper (b) Barium (c) Silver (d) Lead

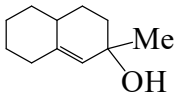
97. How many mmols of NaOH will be used in the titration with 33ml of 3 M HCl to form NaCl and water?

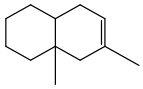
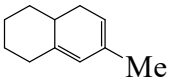
(a) 3 mmol (b) 10 mmol (c) 33 mmol (d) 100 mmol

98. In the given reaction the main product will be



(a) 

(b) 

(c) 
(d) 

99. Which one is the most stable carbonate?

(a) $BaCO_3$ (b) $BeCO_3$ (c) $CaCO_3$ (d) $MgCO_3$

100. Which of the ions have maximum hydration energy?

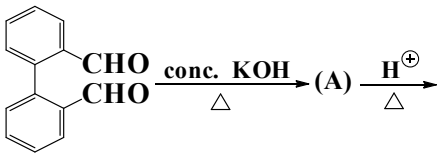
(a) Sr^{2+} (b) Ca^{2+} (c) Mg^{2+} (d) Be^{2+}

101. Which of the following processes is used to do maximum work done on the ideal gas that is compressed to half of its initial volume?

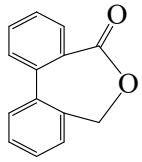
(a) Adiabatic (b) Isobaric (c) Isothermal (d) Isochoric

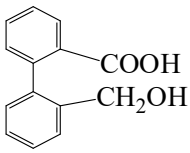
102. K for a zero–order reaction is 2×10^{-2} mole/L/ sec. If the concentration of reactant after 25 sec is 0.5M, the initial concentration must have been :

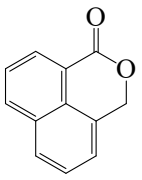
(a) 0.5M (b) 0.75M (c) 1.0M (d) 1.25M

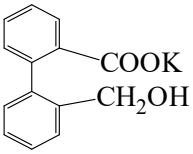
103. 

; Structure of (B) is :

(a) 

(b) 

(c) 

(d) 

104. The type of viscosity which is related with the molecular weight of the polymer is:

(a) Coefficient of viscosity (b) Specific viscosity
(c) Reduced viscosity (d) Intrinsic viscosity

105. Which of the following complexes does not show optical activity?
(a) $[Co(EDTA)]^-$ (b) $[Pt(bn)_2]^{2+}$ (c) $[Pt(pn)_2]^{2+}$ (d) $[Pt(en)_2]^{2+}$

106. Which of the following is not a protonic acid?
(a) $B(OH)_3$ (b) $PO(OH)_3$ (c) $SO(OH)_2$ (d) $SO_2(OH)_2$

107. Increasing order of stability among the three main conformations of 2–fluoroethanol is :
(a) Eclipse,gauche,anti (b) Gauche,eclipse,anti
(c) Eclipse,anti,gauche (d) Anti,gauche,eclipse

108. Permutit is :
(a) A mixture of aluminium oxide and silica (b) Aluminosilicates
(c) Sodium aluminate (d) None

109. Carboxy peptidase is enzyme of which metal :
(a) Fe (b) Mg (c) Cu (d) Zn

110. The rate of nucleophilic substitution reactions are higher in the presence of :
(a) Electron withdrawing groups
(b) Electron releasing groups
(c) Both electron withdrawing and releasing groups
(d) None of the mentioned

111. What does the term "metastable" indicate?
(a) A place where the composition of the system remains constant
(b) A place where the pressure remains constant with low value
(c) An area below which a vapour– liquid mixture is obtained
(d) A region where the temperature remains constant

112. Which of the following statements is not true for a system that has reached the eutectic temperature?
(a) The system is a open system
(b) The system is a miscible fluid
(c) Components lie in liquid state
(d) A region between sublimation and eutectic curve lies stable

113. Which of the following is true about sulphuric acid?
(a) It is a soapy liquid (b) It is a monobasic acid
(c) It is a dibasic acid (d) It is a tribasic acid

114. When an acid reacts with a metal, which one of the following gases is usually liberated?
(a) Ammonia gas (b) Chlorine (c) Oxygen (d) Hydrogen gas

115. In the Lindeman mechanism of unimolecuair reactions, the observed order at low concentration is :
(a) 0.5 (b) 1 (c) 1.5 (d) 2

116. According to Arrhenius equation (K = rate constant and T = temperature)?
(a) ln K decreases linearly with 1/T (b) ln K decreases linearly with T
(c) ln K increases linearly with 1/T (d) ln K increases linearly with T

117. Roots of Madar plant contains –
(a) Indigo (b) Alizarin (c) Saffron (d) Crystal violet

118. The starting materials of PTFE are:
(a) Monochlorotrifluoro ethylene (b) Tetrafluoroethylene
(c) Vinyl chloride (d) Styrene

119. What is the major product formed when ethanol is dehydrated with concentrated H_2SO_4 at 413 K?
(a) Ethene (b) Methoxymethane
(c) Methoxyethane (d) Ethoxyethane

120. What is the half–life of a radioactive substance if 87.5% of any given amount of the substance disintegrates in 40 minutes?
(a) 13 min 20 sec (b) 15 min 20 sec (c) 13 min 40 sec (d) 15 min 40 sec

121. ($_{53}I^{128}$, $t_{1/2}$ = 25 min) after 50 min. the remaining quantity will be
(a) Half (b) Third (c) Quarter (d) Nothing

122. Crystal field splitting energy for octahedral (Δ_o) and tetrahedral (Δ_t) complexes is related as:

(a) $\Delta_t = \frac{4}{9}\Delta_o$ (b) $\Delta_t = \frac{1}{2}\Delta_o$ (c) $\Delta_o = 2\Delta_t$ (d) $\Delta_o = \frac{4}{9}\Delta_t$

123. Which is the correct order of ionic sizes? (At. no. : Ce = 58, Sn = 50,Yb = 70 and Lu = 71)
(a) Ce > Sn > Yb > Lu (b) Sn > Yb > Ce > Lu
(c) Sn > Ce > Yb > Lu (d) Lu > Yb > Sn > Ce

124. Which of the following shows disproportionation reactions?
(a) $[Au(H_2O)_6]^{2+}$ (b) $[Ni(H_2O)_6]^{2+}$ (c) $[Cu(H_2O)_6]^{2+}$ (d) $[Au(CN)_4]^{3-}$

125. Incorrect statement regarding pairing energy is/are
(a) Pairing energy decrease for heavier congeners
(b) Covalency in metal ligand bond decrease with pairing energy
(c) pi acid ligand can decrease the pairing energy
(d) Pairing energy decrease with increase in positive oxidation state of metal

ANSWER KEY

1 (b)	11 (b)	21 (a)	31 (a)	41 (d)	51 (a)	61 (c)	71 (a)	81 (c)	91 (a)	101(a)	111(d)	121(c)
2 (b)	12 (a)	22 (b)	32 (b)	42 (a)	52 (a)	62 (b)	72 (a)	82 (c)	92 (b)	102(c)	112(a)	122(a)
3 (b)	13 (d)	23 (c)	33 (c)	43 (c)	53 (b)	63 (c)	73 (b)	83 (c)	93 (c)	103(a)	113(c)	123(a)
4 (a)	14 (b)	24 (c)	34 (a)	44 (b)	54 (d)	64 (b)	74 (c)	84 (b)	94 (c)	104(d)	114(d)	124(a)
5 (d)	15 (a)	25 (a)	35 (a)	45 (b)	55 (d)	65 (a)	75 (d)	85 (c)	95 (c)	105(d)	115(d)	125(b)
6 (c)	16 (b)	26 (a)	36 (b)	46 (b)	56 (d)	66 (b)	76 (d)	86 (b)	96 (c)	106(a)	116(a)	
7 (b)	17 (a)	27 (d)	37 (c)	47 (b)	57 (d)	67 (b)	77 (a)	87 (b)	97 (d)	107(c)	117(b)	
8 (d)	18 (b)	28 (d)	38 (d)	48 (b)	58 (a)	68 (d)	78 (a)	88 (b)	98 (a)	108(b)	118(a)	
9 (d)	19 (c)	29 (d)	39 (c)	49 (d)	59 (c)	69 (d)	79 (a)	89 (c)	99 (a)	109(d)	119(d)	
10 (d)	20 (d)	30 (d)	40 (b)	50 (b)	60 (a)	70 (c)	80 (d)	90 (b)	100(d)	110(a)	120(a)	

Solution

1. **(b)** In isothermal process $\rightarrow$
Entropy increase enthalpy remains constant

2. **(b)** $w = -P_{ext.}\ \Delta V$
$= -1 \times (10 - 1)$
$W = -9$ L–bar
$\because$ 1L – bar = 100 J
$\omega = -9 \times 100$ J
work done $\omega = -0.9$ kJ

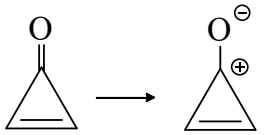
3. **(b)** $r = 0.14$ nm
for FCC $4r = a\sqrt{2}$
$r \rightarrow$ atomic radius
$a \rightarrow$ length of a side of cell

$$r = \frac{a}{2\sqrt{2}}$$

$$0.14\ nm = \frac{a}{2 \times 1.414}$$

$$a = 0.4\ nm$$

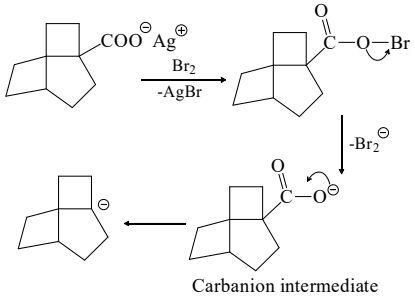
4. **(a)**



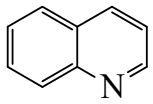
Aromatic

Due to aromatic nature above compound shows maximum dipole moment.

5. **(d)**

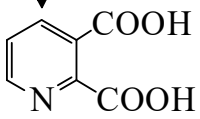


6. **(c)**

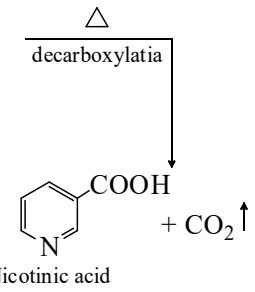


Quino line

$KMnO_4/H^{\oplus}$

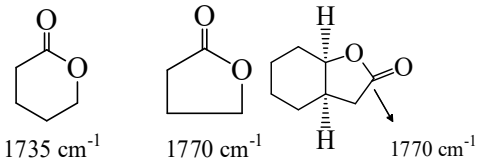


Quino linic acid



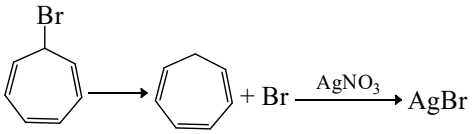
Nicotinic acid

7. **(b)** Exter range of IR $\rightarrow$ 1750 – 1735 cm^{-1}
In cyclic esters C = O frequency increases with decreasing ring size.



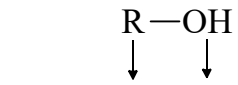
1735 cm^{-1} 1770 cm^{-1} 1770 cm^{-1}

8. **(d)**



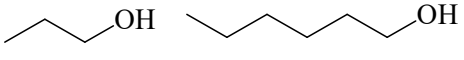
Aromatic

9. **(a)**



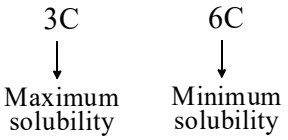
Hydrophobic part Hydrophilic part

As the length of hydrophobic part increases. Solubility in water decreases.

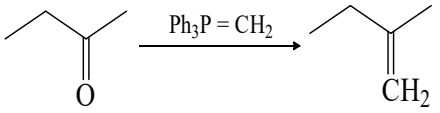


Prophanol Hexanol

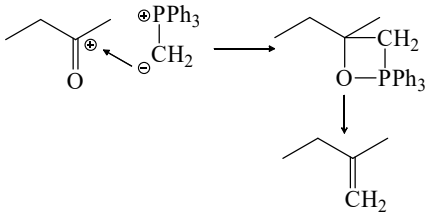
Pentanol Butanol



10. **(d)** Witting reaction



Mechanism



11. **(b)**

12. **(a)** A necessary condition for osmosis is semi-permeable membrane.

13. **(d)** Most all the methods given in the option are used to determine the molar mass of bimolecular but osmosis method is most appropriate and most widely used.

14. **(b)** $t_{1/2} = \frac{2^{n-1}}{n-1} \times \frac{1}{K.A_0^{n-1}}$

$$t_{1/2} \alpha \frac{1}{A_0^{A-1}}$$

Hence ty_2 for n^{th} hat order is inversity proportional to $(n-1)^{th}$ power of initial concentration.

15. **(a)** $K = \frac{2.303}{t} \log \frac{A_o}{A}$

$$K = \frac{2.303}{20} \log \frac{100}{90}$$

$$K = \frac{2.303}{20} (\log 10 - \log 9)$$

$$K = \frac{2.303}{20} \times 0.0458$$

$$t = \frac{2.303}{20} \log 10 \frac{A_o}{A}$$

$$= \frac{2.303 \times 20}{2.303 \times 0.0458} \log \frac{100}{81} \times 100$$

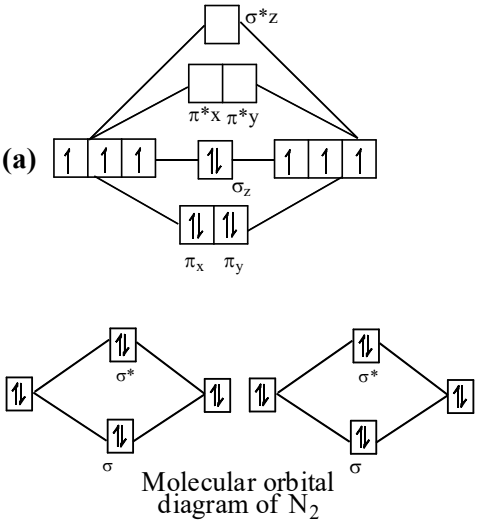
$$= \frac{20}{0.0458} (\log 100 - \log 81)$$

$$= \frac{20}{0.0458} \times 0.915 = 39.96$$

t = 40 min

16. **(b)**

17. **(a)**



Molecular orbital diagram of N_2

Bond order = $\frac{\text{Bonding } e^- - \text{antibonding } e^-}{2}$

Bond order = of $N_2 = \frac{6-0}{2} = 3$

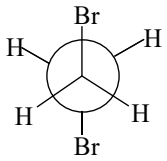
of $N_2^+ = \frac{5-0}{2} = 2.5$

of $N_2^+ = \frac{6-1}{2} = 2.5$

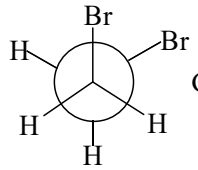
18. **(b)** Electronic transitions are studied by UV spectrometer

19. **(c)**

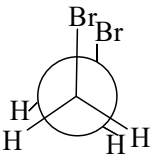
20. **(d)** Since Br is a very bulky group therefore stable is anti conformation.



Note



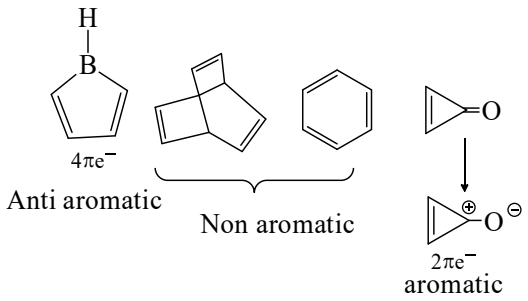
Gauche conformation

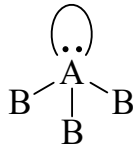


21. **(a)** 4n π $e^- \rightarrow$ Antiaromatic

$(4n + 2)$ $\pi e^- \rightarrow$ Aromatic

Antiaromatic and aromatic compounds are planar, cyclic and have complete conjugation



22. **(c)** 

lone pair = 1

Bond pair = 3

23. **(c)** complexes in which a metal is bound to only one kind of donar groups, eg $\rightarrow$ $[Fe(CN)_6]^{3-}$ Homoleptic complex

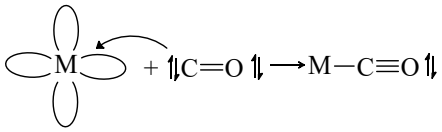
When a metal is bound more than one kind of donar groups, is called hetero – lept complexes.

Eg:- $\left[Co\left(NH_3\right)_4 Cl_2\right]^{\oplus}$

24. **(c)**

25. **(a)**

26. **(a)** When lone pair of e^- of CO donate to vacant orbital of metal, σ bond forms.



When metal donate it's electrons to CO then π bond forms. Which is called back bonding.

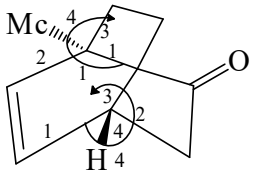
27. **(d)** Octahedral geometry can have two type of hybridization.
i.e. sp^3d^2, d^2sp^3

28. **(d)** To find out the configuration following steps should be followed –

(i) Give priority to all 4 group (Higher mass have higher priority)

(ii) Rotate priority 1 to 4
If clockwise rotation $\rightarrow$ R configuration
If anticlockwise rotation $\rightarrow$ S configuration

(iii) If u^{th} group is an wedge (-)
Configuration will be change.



Clockwise $\rightarrow$ R

Anti clockwise $\rightarrow$ S
But 4^{th} on wedge
S $\rightarrow$ R
1R, 4R

29. **(d)**

30. **(d)** Up to down $\rightarrow$ Atomic radius increase
Left to right $\rightarrow$ Atomic radius decrease
In isoelectronic species, higher the negative charge, higher the ionic radius and higher the positive charge, lower the ionic radius.

$N^{3-} > O^{2-} > F^{-} > Ne > Na^{+} > Mg^{++} > Al^{+++}$

Hence option (d) is incorrect.

31. **(a)** **On dilution $\rightarrow$**
- Molar conductance increase
- Equivalent conductance increase
- Specific conductance decrease

32. **(b)** **Spectrochemical series $\rightarrow$**

$CO > CN^{-} > en > NH_3 > EDTA^{4-} >$
$NCs^{-} > H_2O > O^{-2} > C_2O_4^{2-} > OH^{\ominus}$
$> F^{\oplus} > Cl^{-} > SCN^{\ominus} > S^{-} > Br^{\ominus} > I^{\ominus}$

All the compounds given is options are in d^6 state. Hence Δ_o should be equal to all but strong field ligands (CO, CN^{-}, en etc.) have high Δ_o then low field ligands ($I^{\ominus}, Br^{\ominus}, S^{-}$ etc.)

Δ_o order $\rightarrow [Co(CN)_6]^{3-} >$
$[Co(NH_3)_6]^{3+} > [Co(C_2O_4)_3]^{3-} >$
$[Co(H_2O)_6]^{3+}$

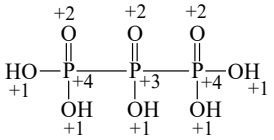
33. **(c)** On increasing the concentration of reactant in a reversible reaction, equilibrium concentrations will unchange.

34. **(a)**

Super closo	$[B_nH_n]^{2+}$
Hyper closo	$[B_nH_n]^{o}$
Close	$[B_nH_n]^{2-}$
Nido	$[B_nH_n]^{4-}$
Arachno	$[B_nH_n]^{6-}$
Hypo	$[B_nH_n]^{8-}$
Clado	$[B_nH_n]^{10"}$

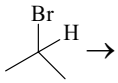
$[B_{12}H_{12}]^{2-} \rightarrow [B_nH_n]^{2-}$ closo structure

35. **(a)** $H_5P_3O_8$

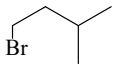


36. **(b)** for combustion reaction

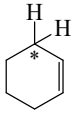
$$\Delta H = \sum H_{Reactant} - \sum H_{Product}$$

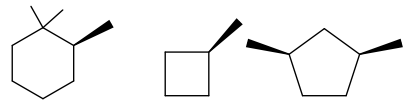
37. **(c)**  → optically inactive

2-Bromo propane

 → optically inactive

1-Bromo 3 methyl Butane

 optically active → Exists as a pair of enantiomers Cyclo hex-2-ene-1-ol

38. **(d)** 

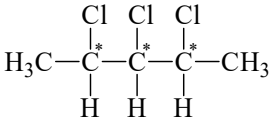
POS absent → Chiral

POS present → Achiral

POS present → Achiral

Note → Compound having plane of symmetry (POS) are optically inactive and achiral.

39. **(c)** **Chiral carbon** → An carbon atom that is bonded to four different types of atoms or groups or groups of atoms.



Hence 3 chiral atoms are present.

40. **(b)** Both compounds are identical

41. **(d)**

At NTP	At STP
Volume = 22.4 L	22.4L
Temp = 298 K	273 K
Pressure = 1 atm	1 atm

42. **(a)** Average speed $V_{avg} = \sqrt{\frac{8RT}{\pi M}}$

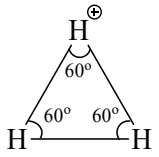
$$V_{ang} \alpha \sqrt{\frac{T}{M}} = (V_{avg})O_2 = (V_{av})CH_4$$

$$\sqrt{\frac{T_{O_2}}{M_{O_2}}} = \sqrt{\frac{T_{CH_4}}{M_{CH_4}}}$$

$$\sqrt{\frac{300}{32}} = \sqrt{\frac{T_{CH_4}}{16}}$$

$$T_{CH_4} = 300K$$

43. **(c)** $H_3^{\oplus}$



44. **(b)** **Associated colloid** → Micelles, soap
Macro molecular colloid → Starch, Cellulose, Proten and enzymes.
Multimolecular colloid → Gold, sol, S_8

45. **(b)** **Antacides cures** → Stomach ache

46. **(b)** $PhMgBr + CH_2(O)CH_2$

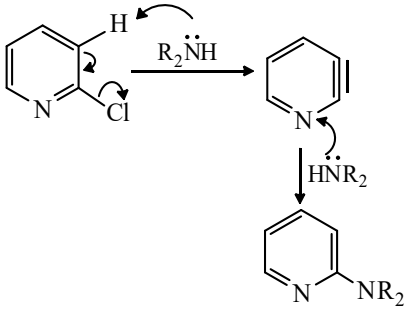
$Ph-CH_2-CH_2-O^{\ominus}$

$\downarrow H^{\oplus}$

$Ph-CH_2-CH_2-OH$

Primary alcohol

47. **(b)**



48. **(b)**

49. **(d)**

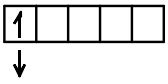
50. **(b)** n = 3

l = 2 (d subshell)

m = +2

s = +1/2

$3d^1$

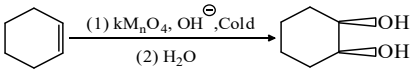


n = 3, l = 2, m = +2, s = +1/2

Atomic number (z) = 21

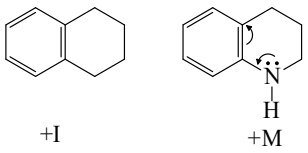
Electronic configuration $\rightarrow$ $[Ar]4s^23d^1$

51. **(a)**

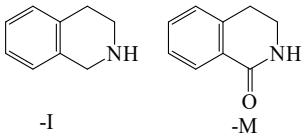


52. **(a)** $Al(OH)_3$ are lewis acid, rest are base.

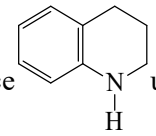
53. **(b)** Electron donating group increase the rate of the electrophilic aromatic substitution and vice – versa.



+I +M

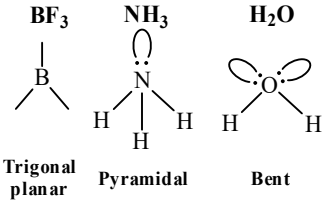


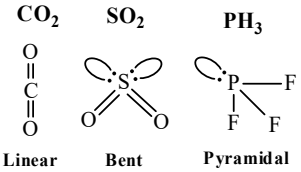
-I -M

Hence  undergoes

bromination with fastest rate.

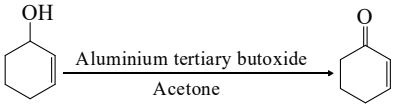
54. **(d)**





Hence NH_3 and PH_3 have similar geometry.

55. **(d)** Oppeneur oxidation



56. **(d)** Characteristics of chemisorptions.

- **i.** Chemical bond formation
- **ii.** Highly specific in nature
- **iii.** Irreversible
- **iv.** Enthalpy of adsorption is high (80 – 240 kJ mol)
- **v.** High temperature is favourbles
- **vi.** High activation energy is required.
- **vii.** Unimolecular layer forms
- **viii.** Depends on nature of adsorbate and adsorbent.

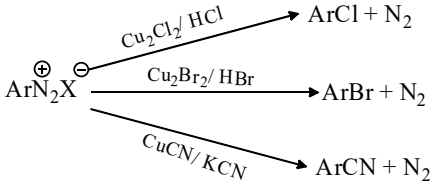
Hence option (d) is correct.

57. **(d)**

Colloidal solution	Dispersion medium	Dispersd phase
Aerosol	Gas	Solid/liq.
Hydrosol	water	Solid
Alcohol	Alcohol	Solid

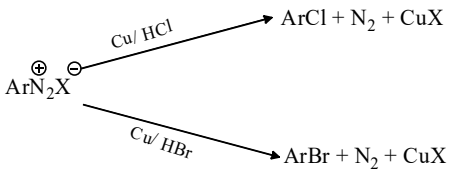
58. **(a)**

59. **(c)** **Sandmayer reaction** $\rightarrow$

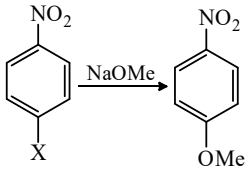


Note – Iodobenzene can't be formed by sandmeyer reaction.

60. **(a)** **Gatterman reaction** $\rightarrow$



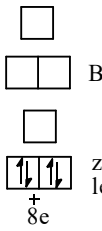
61. **(c)** Rate I > Br > Cl > F



62. **(b)** Werner's theory of co-ordination 1892 Compounds $\rightarrow$ main postulates are

1) Two types of valenes $\rightarrow$ primary & secondary
2) Primary valences are ionisable and non-directional, satisfied by negative ions.
3) Secondary valence are non-ionisable and directional, satisfied by neutral molecules or negative ions.
4) Primary valences showed by dotted line (…….) while secondary valences showed by thick line (——)

63. **(c)** $C_2 = 12e^-$



Bond order $= \frac{4 - 0}{2} = 2$

zero unpaired electron
lence diamagnetic

8e

64. **(b)** Micro states = (2S + 1) (2L + 1)

^3F L = 3

$2S + 1 = 3$

Micro states $= 3 \times (2 \times 3 + 1)$

$= 3 \times 7 = 21$

65. **(a)** $[C_pMo(CO)_3]_2$

$VE = 2[5 + 6 + 2 \times 3] = 34$

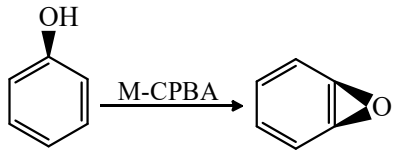
$$M - M \text{ bond} = \frac{18n - VE}{2}$$

n = number of metals

$$= \frac{18 \times 2 - 34}{2}$$

M-M bond = 1

66. **(b)**

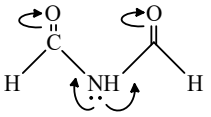


(H-bonding)

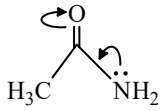
67. **(b)** Rotation barrier α Bond strength

(I) $CH_3\text{-}CH_2\text{-}NH_3$

(II)



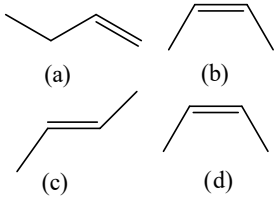
(III)



C-N bond strength III > II > I

Rotation Barrier III > II > I

68. **(d)** Heat of hydrogenation $\alpha \frac{1}{\text{stability}}$



Stability order d > c > b > a

Heat of hydrogenation a > b > c > d (smallest HOH)

69. **(d)** $\left(\lambda_{eq}\right)Ba^{2+} = 127\Omega^{-1}cm^{-1}eq^{-1}$

$\left(\lambda_{eq}\right)Cl^{-} = 76\Omega^{-1}cm^{-1}eq^{-1}$

$\lambda_{BaCl_2} = \lambda_{Ba^{2+}} + 2\lambda_{Cl^-}$

$= 127 + 2 \times 76$

$= 279\ \Omega^{-1}cm^{-1}eq^{-1}$

70. **(c)** For spontaneous adsorption of gas

(1) Entropy change is positive

(2) ΔH should be highly negative

71. **(a)** **Haber's process** $\rightarrow$

$N_2 + 3H_2 \xrightarrow{Fe, Mo} 2NH_3$

$Fe \rightarrow$ Act as catalyst

$Mo \rightarrow$ Act as promoter

72. **(a)** For 2nd order reaction

$$\frac{1}{A_2} - \frac{1}{A_1} = K\left(t_2 - t_1\right)$$

$A_2 = 0.5, A_1 = 1$

$t_2 = 1, t_1 = 0$

$$\frac{1}{0.5} - \frac{1}{1} = K(1 - 0)$$

$2 - 1 = K$

$K = 1$

$A_2 = 0.33, A_1 = 0.5$

$t_2 = 2, t_1 = 1$

$$\frac{1}{0.33} - \frac{1}{0.5} = K(2-1)$$

$K = 1$

$A_2 = 0.25, A_1 = 0.33$

$t_2 = 3, t_2 = 2$

$$\frac{1}{0.25} - \frac{1}{0.33} = K(3-2)$$

$K = 1$

Hence reaction is 2nd order reaction

Note → Fro 0th order reaction

$$\frac{A_2 - A_1}{t_1 - t_2} = \frac{A_3 - A_2}{t_2 - t_3} = \frac{A_4 - A_3}{t_3 - t_4} = K$$

For 1st order reaction

$$\frac{\log_e A_2 - \log_e A_1}{t_2 - t_1}$$

$$= \frac{\log_e A_3 - \log_e A_2}{t_3 - t_1} = -K$$

73. **(b)** Nitrogen base + sugar + Phosphate

Nucleoside

Nucleotide

74. **(c)** Hydrogen bonding in DNA

$C \equiv G$ (Cytosine and guanine)

A=T (Adenine and thyning)

75. **(d)** Glycene, proline and hydroxyl proline contribute to 57% of total amino acids in collagen, which accounts for one-third of proteins in animals.

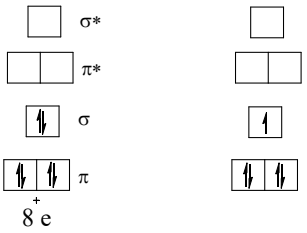
76. **(d)**

77. **(a)** C_3^{4-} $^{-2}C \overset{\pi}{=} C \overset{\pi}{=} C^{-2}$

σ bond = 2

π bond = 2

78. **(a)** $N_2 = 14e^-$ $N_2^{\oplus} = 13\ e^-$



For the formation of $N_2^{\oplus}$, electron will be removed from σ orbital.

79. **(a)** $ICl_2^{\ominus}$ Cl—I(⊖)—Cl

XeF_2 F—Xe—F

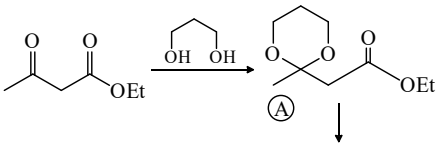
	XeF_2	$ICl_2^{\ominus}$
Hybridization	sp^3d	sp^3d
Geometry	TBP	TBP
Shape	lnear	linear

80. **(d)** Iodoform is used as an antiseptic due to liberation of free iodine.

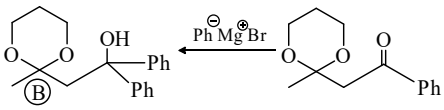
81. **(c)**

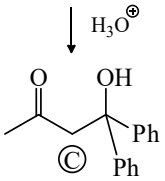
82. **(c)**

83. **(c)**



84. **(b)**





85. **(c)** $\Delta G = \Delta G^{o} + RT \ln k$

At equilibrium "G = 0

$0 = \Delta G^{o} + RT \ln k$

$$\boxed{\Delta G^{o} = -RT \ln k}$$

$$\ln k = \frac{\Delta G}{-RT} \because \Delta G^{o} = -nFE^{o}\ \text{cell}$$

$$\ln k = \frac{-nFE^{o}_{cell}}{-RT}$$

$$\ln k = \frac{nF\,E^{o}_{cell}}{RT}$$

86. **(b)**

87. **(b)**

88. **(b)**

89. **(c)**

90. **(b)** $Q_c = K_c$ equilibrium

$Q_c < K_c$ forward direction

$Q_c > K_c$ Backward direction

$Q_c \rightarrow$ concentration quotient, $K_c \rightarrow$ equilibrium constant

91. **(b)**

92. **(b)** $\Delta t = \frac{4}{3}\Delta_o$

$\Delta_{sp} = 1.3\Delta_o$

$$\boxed{\Delta_{sp} > \Delta_o > \Delta_t}$$

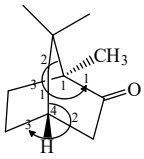
Square octahedral tetrahedral planar

93. **(c)** When a compound absorbed any particular wavelength of a particular colour. Then it shows, its complementary colour.

Colour cycle of complementary colour

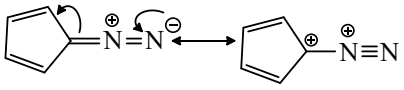
If compound absorbed orange coloure, the colours of compound will be **Blue**.

94. **(d)** Anticlock wise $\rightarrow$ S



Clockwise R but 4th on wedge R $\rightarrow$ S

1S, 4S

95. **(c)** 

96. **(c)** MO type $\rightarrow$ CuO, BaO, PbO

97. **(d)** 33 ml of 3 M HCl

$$M = \frac{n}{V} \times 1000$$

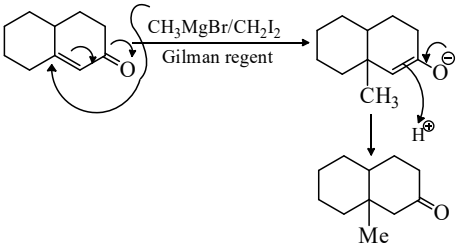
$$3 = \frac{n_{HCl}}{33} \times 1000$$

$n_{HCl} = 100 \times 10^{-3}$ mol

$n_{HCl} = 100$ m mol

Hence 100 m mol NaOH required

98. **(a)**



99. **(a)** Thermal stability of carbonates of alkaline earth metal increases down the group.

$BeCO_3 < MgCO_3 < CaCO_{3-} < SrCO_3 < BaCO_3$

100. **(d)** Hydration energy $\propto \frac{\text{Charge}}{\text{size}}$

Size $Be^{2+} < Mg^{+2} < Ca^{+2} < Sr^{+2} < Ba^{++}$

Hydration energy $Be^{+2} > Mg^{+2} < Ca^{+2} > Sr^{+2} > Ba^{++}$

101. **(b)** **<u>Work done</u>**

Isobaric > Isothemal > Adiabatic > Isochoric

102. **(c)** $K = 2 \times 10^{-2}$ mol L^{-1} sec^{-1}

t = 25 sec

A = 0.5 M

$A = A_o - Kt$

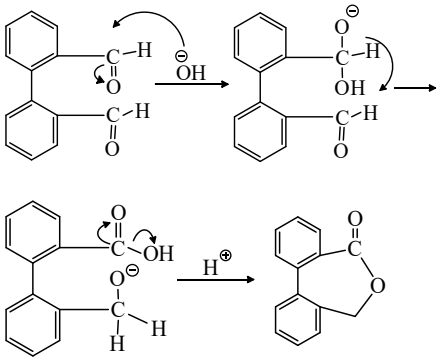
$0.5 = A_o - 2 \times 10^{-2} \times 25$

$A_o = 0.5 +$

$A_o = 0.5 + 0.5$

$\boxed{\mathbf{A_o = 1M}}$

103. **(a)**



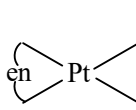
104. **(d)** **Mark – Kuhn – Houw ink equation** $\rightarrow$

$$[n] = K\left(\overline{M}_v\right)^{\alpha}$$

$[n] \rightarrow$ Intrinsic viscosity

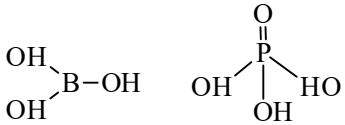
K, $\alpha \rightarrow$ constant

$M_v \rightarrow$ Molecular mass

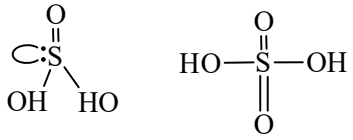
105. **(d)** 

POS $\rightarrow$

Optically inactive

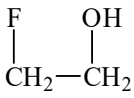
106. **(a)** 

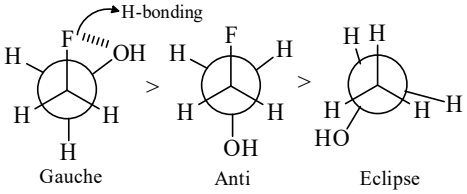
Protic acid Protic acid



Lewis acid Protic acid

107. (c)



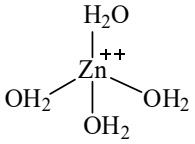


Gauche Anti Eclipse

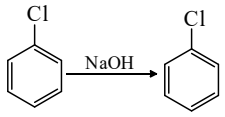
Stability Gauche > Anti > Eclipse

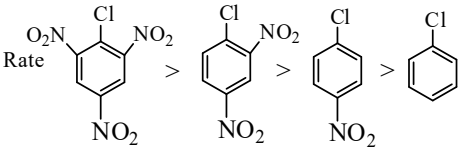
108. (b) Per mutit $\xrightarrow{\text{is}}$ Aluminosilicates

109. (d) Carboxy peptidase



110. (a) In the presence of electron electron withdrawing group rate of nucleophilic substitution reactions increases

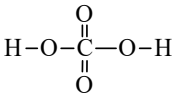




111. (d)

112. (a) .

113. (c) Sulphuric acid is a dibasic acid



114. (d) $M + HCl \rightarrow MCl + H_2 \uparrow$

115. (d) Lindemann equation

$$\text{Rate} = \frac{dP}{dt} = \frac{K_1K_2\left[A^2\right]}{K_{-1}[A]+K_2}$$

At law concentration $K_1[A] < K_2$

$$\frac{dP}{dt} = \frac{K_1K_2\left[A^2\right]}{K_2+K_2}$$

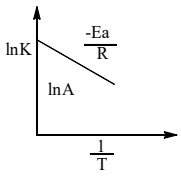
$$\frac{dP}{dt} = \frac{K_1}{2}\left[A^2\right]$$

2nd order kinetic

116. (a) $\left[K = A.e^{-Ea/RT}\right]$

$$\ln k = \ln A - \frac{Ea}{RT}$$

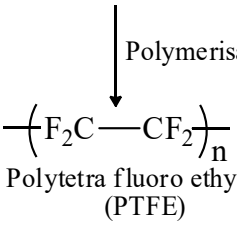
$y = c + m\,x$



Hence ln K decreases lineary with time

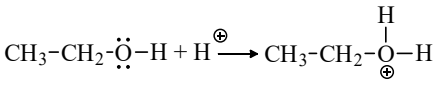
117. (b) Roots of modar plant contains Alizarin.

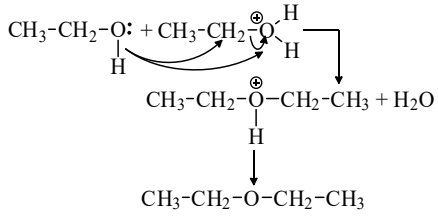
118. (b) $F_2C{=}CF_2$
Tetrafluoro ethylene



Polytetra fluoro ethylene
(PTFE)

119. (d) **Mechanism**

(I) 

(II) 

120. (a) $3 \times t_{1/2} = t_{87.5\%}$

$3 \times t_{1/2} = 40$ min

$t_{1/2} = 13\frac{1}{3}$ min

$t_{1/2} = 13$ min 20 sec

121. (c) $t_{1/2} = 25$ min

$K = \frac{0.693}{t_{1/2}}$

$K = \frac{0.693}{25} = \frac{2.303 \times \log 2}{25}$

$t = \frac{2.303}{K} \log \frac{A_o}{A}$

$56 = \frac{2.303 \times 25}{2.303 \times \log 2} \times \log \frac{A_o}{A}$

$2 \times \log 2 = \log \frac{A_o}{A}$

$\log 2^2 = \log \frac{A_o}{A}$

$4 = \frac{A_o}{A}$

$A = \frac{A_o}{4}$

122. (a)

123. (a) Ce, Xb & Lu are uf – series elements and in uf series on going left to right ionic radius decreases.
Ce > Yb > Lu

124. (a)

125. (b)